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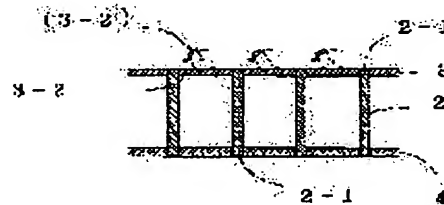
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(54) FASTENING STRUCTURE OF PLATE MEMBER AND METHOD OF FIXING PLATE MEMBER

(57)Abstract:

PROBLEM TO BE SOLVED: To easily and simultaneously insert/fit one side ends of members to be mounted such as blades, which are erected in many with the other side ends held, into inserting small holes or grooves of plate members corresponding to respective members to be mounted.

SOLUTION: This fastening structure of plate members and members to be mounted is constituted so that small holes or grooves are pierced to plate members represented by side plates 3 in an impeller, end parts 2-1 of members to be mounted represented by blades 2 in the impeller are inserted into the holes or the grooves and both are held/fixed. To this end, the small holes or grooves are formed as its one side is a louvered part, by bending back the louvered part, the end parts of the member to be mounted fitted into the small holes or grooves are held/fixed. Alternatively, end part small holes are formed in the blade end parts fitted into the small holes or grooves formed in side plates, the tips due to bending back the louvered parts of the side plates are bitten into the end part small holes, thus, holding strength is increased.



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CLAIMS

[Claim(s)]

[Claim 1] The stoma or slot which drills a stoma or a slot in a plate member, and is drilled in a plate member in the conclusion structure of the plate member and covering member which insert a covering member edge in this stoma or a slot, and carry out maintenance immobilization of both Conclusion structure of the plate member and covering member which are characterized by being constituted so that maintenance immobilization of the covering member edge where one of them was formed as an OFF erection, and it was attached in said stoma or slot by bending return of this OFF erection may be carried out.

[Claim 2] In the conclusion structure of the side plate of both sides, and the side plate and blade in the impeller formed with two or more blades by which suspension is carried out to this both-sides plate, the stoma or slot drilled by the side plate Conclusion structure of the side plate and blade in the impeller characterized by being constituted so that maintenance immobilization of the attachment edge of a blade where one of them was formed as an OFF erection, and it was attached in said stoma or slot by bending return of this OFF erection may be carried out.

[Claim 3] Conclusion structure of the side plate and blade in the impeller according to claim 2 to which an edge stoma is formed in the edge of the blade attached in the stoma or slot formed in the side plate, and the head by bending return of the OFF erection of a side plate is characterized by raising maintenance reinforcement by eating into this edge stoma.

[Claim 4] The fixed approach of of the plate member and the covering member which are characterized by to have the process which forms the stoma or the slot where one of them is formed in the plate member as an OFF erection, the process which insert a covering member edge in this stoma or a slot, and the process which return the OFF erection formed in said stoma or slot where a covering member edge is inserted in order to insert a covering member edge.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the conclusion means of the plate member in which a stoma or a slot which is represented by conclusion with the side plate and blade in an impeller was formed, and the covering member by which attachment maintenance is carried out in said stoma or slot.

[0002]

[Description of the Prior Art] The impeller of a sirocco fan is explained as an example of representation of this invention object. Drawing 5 - drawing 7 are the front view and view fragmentary sectional view showing the configuration of the impeller of a sirocco fan, and the explanatory view showing the situation of the assembly of a side plate and a blade, respectively.

[0003] Since the whole impeller structure itself is a well-known thing, a detail is excluded, but the projection for conclusion of blade one end is attached in the stoma of a lower side plate, and fixed maintenance of the other end of the blade which coexists in the shape of radii is carried out by the attachment to the stoma of the projection for conclusion also with the upper side plate so that it may see to drawing 6 which shows the blade of one sheet which forms the impeller concerned. Usually, since many both-sides plates which constitute an impeller are being mutually fixed by the coexisting blade Since the play with the so-called fitting section require dimension relation with the blade insertion hole of the above-mentioned side plate and the projection for conclusion by the side of a blade close to adjustment, and big from the field of a location gap or maintenance maintenance on the strength is not desirable, Although carrying out attachment insertion of the blade concerned simultaneously did not very produce a problem, either, when there were few blades, with the configuration which requires many blades, the cost- [difficulty / the difficulty of insertion assembly is high and] demerit of the actual condition was large.

[0004] Drawing 7 is what shows the situation of other end insertion of the blade to the side plate which becomes the conventional technique as above-mentioned. Although one end of each blade is held with the lower side plate, it is not expectable that the blade of coexisting a large number is located so that the stoma for insertion of an upside side plate may not necessarily be countered. Each had shifted forward and backward and the projection for attachment of blade many items was what cannot be attached in the stoma for insertion in moving a side plate simply.

[0005]

[Problem(s) to be Solved by the Invention] It was most difficult to have carried out attachment insertion of the other end of the blade coexisting [many] with the conventional configuration like **** simultaneous to the stoma for insertion of the side plate corresponding to each blade, and the actual condition was that the extensive improvement is called for in respect of the number of erectors.

[0006]

[Means for Solving the Problem] The conclusion structure of the plate member and covering member which grow into this invention In order to drill a stoma or a slot in the plate member represented with the side plate in an impeller, to insert the covering member edge represented as well as this stoma or a slot by the blade in an impeller and to carry out maintenance immobilization of both, As for the stoma or slot drilled in a plate member, one of them is formed as an OFF erection. It is constituted so that maintenance immobilization of the covering member edge attached in said stoma or slot by bending return of this OFF erection may be carried out. Or an edge stoma is formed in the edge of the blade attached in the stoma or slot formed in the

side plate, it is constituted so that the head by bending return of the OFF erection of a side plate may raise maintenance reinforcement by eating into this edge stoma, and it is [0007]. Moreover, in order to insert a covering member edge as an approach of realizing the above-mentioned configuration clue, it has the process which forms the stoma or the slot where one of them is formed in the plate member as an OFF erection, the process which insert a covering member edge in this stoma or a slot, and the process which return the OFF erection formed in said stoma or slot where a covering member edge is inserted, and fixed maintenance is carried out.

[0008]

[Example] Although a drawing explains below the side plate and blade which form the impeller of a sirocco fan for the example of this invention as a typical gestalt of the object configuration concerned as above-mentioned as an example, it cannot be overemphasized that it is what is applied to conclusion with the general member which was, and the covering member by which attachment maintenance is carried out at this.

[0009] Although the blade of a large number which drawing 1 is the fragmentary sectional view of the example of the impeller-which grows into this invention, and fix to a downward side plate and coexist is held at the side plate of the upper part [other end / the], one of them is formed as an OFF erection so that he can understand the upper stoma for blade insertion or upper slot concerned on the side plate with reference to the explanatory view showing the situation of insertion attachment of drawing 3 and drawing 4.

[0010] When the stoma for insertion or slot formed in the upper part other end of the coexisting blade at the upper part side plate is made to approach as shown in drawing 3, the stoma for insertion or slot which makes the above-mentioned OFF erection one side It is formed in a bigger dimension than the thickness of a blade, insertion easy-ization is meant, an insertion condition which is seen to drawing 4 is embodied, and it obtains like the blade fixing up which shows the OFF erection shown in both drawings to above-mentioned drawing 1 by returning to the original side plate flat-surface side.

[0011] Moreover, in order to raise the joint strength of the blade edge by bending return of the above-mentioned OFF erection, it is also friendship to drill an edge stoma in a blade edge, as shown in drawing 2, and to aim at intrusion of the OFF erection head to this edge stoma by bending return of an OFF erection.

[0012] Although the above-mentioned example shows the structure which forms an OFF erection in one stoma for insertion or slot of an upper part side plate, it is not below applicable also until it says, and also until it also says that it can opt for the configuration of the stoma or slot which there is not and is established in a side plate etc.

[0013] furthermore, the means of the conventional common knowledge besides joining according to the exposure of a laser beam also about the means for detachable after attachment with a side plate and a blade edge -- arbitration addition -- it is selectable.

[0014] And like ***, there is nothing also until it says not only an impeller but that it is useful as a conclusion means in the configuration of a general covering member attached in the plate member in which the stoma or the slot was formed, said stoma, or a slot.

[0015]

[Effect of the Invention] The conclusion means of the plate member and covering member which grow into this invention has high utility value as a conclusion means by which the dependability in the maintenance structure after insertion attachment being not only easy but attachment is high.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view shown in the partial cross section of the example of the impeller which grows into this invention.

[Drawing 2] It is the partial expanded sectional view of another example of the impeller which grows into this invention.

[Drawing 3] It is the explanatory view showing the situation before the blade (covering member) edge insertion to the side plate (plate member) of the example of drawing 1 or drawing 2.

[Drawing 4] It is the explanatory view showing drawing 1 or the blade (covering member) edge insertion condition to the side plate (plate member) of the example of drawing 2.

[Drawing 5] It is the front view of the impeller shown as an example which grows into the conventional technique.

[Drawing 6] It is the view sectional view showing the attachment condition of the side plate (plate member) of the example of drawing 5, and a blade (covering member).

[Drawing 7] It is the explanatory view showing the condition before attachment with the side plate (plate member) of the example of drawing 5, and a blade (covering member).

[Description of Notations]

1 Impeller

2 Blade (Covering Member)

2-1 Small Projection for Insertion Attachment of Blade (Attachment Section of Covering Member)

2-2 Edge Stoma Drilled in Small Projection for Insertion Attachment of Blade (Attachment Section of Covering Member)

3 Side Plate of Another Side (Plate Member)

3-1 Stoma or Slot of Side Plate on Another Side

3-2 OFF Erection Which Constitutes One Side of Stoma of Side Plate of Another Side, or Slot

3-2' Bending return of an OFF erection

4 One Side Plate (Plate Member)

4-1 One Stoma or Slot on the Side Plate

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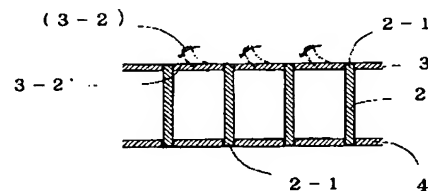
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(54) 【発明の名称】 板部材の締結構造と固定方法

(57) 【要約】 (修正有)

【課題】 片端で保持されて多数並立するブレード等、被着部材の他端を、夫々の被着部材に対応する板部材の挿入用小孔もしくは溝に同時に嵌着挿入することを容易にする。

【解決手段】 本発明に成る板部材と被着部材との締結構造は、インベラにおける側板3で代表される板部材に小孔もしくは溝を穿設し、該小孔もしくは溝に同じくインベラにおけるブレード2に代表される被着部材端部2-1を挿入して両者を保持固定するため、板部材に穿設する小孔もしくは溝は、その一辺が切起部として形成され、該切起部の曲げ戻しにより前記小孔もしくは溝に嵌着された被着部材端部が保持固定され、または側板に形成された小孔もしくは溝に嵌着されるブレードの端部に、端部小孔が形成され、側板の切起部の曲げ戻しによる先端が、該端部小孔に食い込むことで保持強度を高める。



【特許請求の範囲】

【請求項 1】 板部材に小孔もしくは溝を穿設し、該小孔もしくは溝に被着部材端部を挿入して両者を保持固定する板部材と被着部材との締結構造において、板部材に穿設する小孔もしくは溝は、その一辺が切起部として形成され、該切起部の曲げ戻しにより前記小孔もしくは溝に嵌着された被着部材端部が保持固定されるように構成されていること、を特徴とする板部材と被着部材との締結構造。

【請求項 2】 両側の側板と、該両側板に懸架される複数のブレードで形成されるインベラにおける側板とブレードとの締結構造において、側板に穿設される小孔もしくは溝は、その一辺が切起部として形成され、該切起部の曲げ戻しにより前記小孔もしくは溝に嵌着されたブレードの嵌着端部が保持固定されるように構成されていること、を特徴とするインベラにおける側板とブレードとの締結構造。

【請求項 3】 側板に形成された小孔もしくは溝に嵌着されるブレードの端部に、端部小孔が形成され、側板の切起部の曲げ戻しによる先端が、該端部小孔に食い込むことで保持強度を高めていること、を特徴とする請求項 2 に記載のインベラにおける側板とブレードとの締結構造。

【請求項 4】 被着部材端部を挿入するため、板部材にその一辺が切起部として形成されている小孔もしくは溝を形成する工程と、該小孔もしくは溝に被着部材端部を挿入する工程と、被着部材端部が挿入された状態で、前記小孔もしくは溝に形成された切起部を曲げ戻す工程とを備えること、を特徴とする板部材と被着部材との固定方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、インベラにおける側板とブレードとの締結に代表されるような、小孔もしくは溝を形成した板部材と、前記小孔もしくは溝に嵌着保持される被着部材との締結手段に関する。

【0002】

【従来の技術】本発明対象物の代表例として、シロッコファンのインベラについて説明する。図5～図7は夫々、シロッコファンのインベラの構成を示す正面図、矢視部分断面図と、側板とブレードとの組立の様子を示す説明図である。

【0003】インベラの全体構造そのものは周知のものであるので詳細を省くが、当該インベラを形成する一枚のブレードを示す図6に見るように、下側の側板の小孔にブレード片端の締結用突起が嵌着され、円弧状に並立するブレードの他端は上側の側板とも締結用突起の小孔への嵌着で固定保持されている。通常インベラを構成する両側板は、多数並立するブレードにより互いに固定されているので、上記側板のブレード挿入孔とブレード側

の締結用突起とは整合に近い寸法関係を要し、位置ずれや保持強度維持の面からも、所謂嵌合部の大きな遊びは好ましくないものであるため、ブレード数が少ないときには、当該ブレードを同時に嵌着挿入することもさして問題を生じないが、多数のブレードを要する構成では、挿入組立の難度が高くコスト的なデメリットが大きいのが実態であった。

【0004】図7は上述の通り従来技術になる側板へのブレードの他端挿入の様子を示すもので、各ブレードの片端が下側の側板で保持されているとは言え、並立する多数のブレードは必ずしも上側側板の挿入用小孔に対向するように位置することは期待できず、夫々が前後にずれておりブレード多端の嵌着用突起は、側板を単純に移動させることでは挿入用小孔に嵌着し得ないものであった。

【0005】

【発明が解決しようとする課題】上述の如き従来の構成では、多数並立するブレードの他端を、夫々のブレードに対応する側板の挿入用小孔に同時に嵌着挿入することは至難で、組立工数の面で大幅な改善を求められているのが実態であった。

【0006】

【課題を解決するための手段】本発明に成る板部材と被着部材との締結構造は、インベラにおける側板で代表される板部材に小孔もしくは溝を穿設し、該小孔もしくは溝に同じくインベラにおけるブレードに代表される被着部材端部を挿入して両者を保持固定するため、板部材に穿設する小孔もしくは溝は、その一辺が切起部として形成され、該切起部の曲げ戻しにより前記小孔もしくは溝に嵌着された被着部材端部が保持固定されるように構成され、または側板に形成された小孔もしくは溝に嵌着されるブレードの端部に、端部小孔が形成され、側板の切起部の曲げ戻しによる先端が、該端部小孔に食い込むことで保持強度を高めるように構成され、

【0007】また、上記構成緒を実現する方法として、被着部材端部を挿入するため、板部材にその一辺が切起部として形成されている小孔もしくは溝を形成する工程と、該小孔もしくは溝に被着部材端部を挿入する工程と、被着部材端部が挿入された状態で、前記小孔もしくは溝に形成された切起部を曲げ戻す工程とを備え固定保持される。

【0008】

【実施例】以下図面によって本発明の実施例を、上述の通り当該対象構成の代表的な形態として、シロッコファンのインベラを形成する側板とブレードを例として説明するが、一般的ないた部材と、これに嵌着保持される被着部材との締結に適用されるものであることは言うまでもない。

【0009】図1は、本発明に成るインベラの例の部分断面図で、下方の側板に固着されて並立する多数のブレード

ードは、その他端が上方の側板に保持されるが、当該上方の側板のブレード挿入用小孔もしくは溝は、図3及び図4の挿入嵌着の様子を示す説明図を参照して理解できるように、その一边は切起部として形成されている。

【0010】図3に示すように、並立するブレードの上方他端に上方側板に形成された挿入用小孔もしくは溝を接近させたとき、上記切起部を一边とする挿入用小孔もしくは溝は、ブレードの厚みより大きな寸法に形成されて挿入容易化を意図し、図4に見るような挿入状態を具現し、両図に示す切起部を元の側板平面側に曲げ戻すこと

とで、上述図1に示すブレード固着上程を得るものである。

【0011】また、上述切起部の曲げ戻しによるブレード端部の締結強度を高めるため、図2に示すようにブレード端部に端部小孔を穿設し、切起部の曲げ戻しによる該端部小孔への切起部先端の食いこみを図ることも友好である。

【0012】上述の例では、一方の上方側板の挿入用小孔もしくは溝に切起部を形成する構造を示しているが、下方にも適用できることは言うまでも無く、また側板に設ける小孔もしくは溝の形状等も任意選択可能であることも言うまでも無い。

【0013】更に、側板とブレード端部との嵌着後の固着手段についても、レーザー光線の照射による溶着のほか、従来周知の手段も任意付加選択可能である。

【0014】そして、上述の如く、インペラに限らず、小孔もしくは溝を形成した板部材と前記小孔もしくは溝に嵌着される被着部材一般の構成での締結手段として有用なことも言うまでも無い。

【0015】

【発明の効果】本発明に成る板部材と被着部材との締結手段は、挿入嵌着が容易であるばかりでなく、嵌着後の＊

＊保持構造での信頼性の高い締結手段として利用価値が高い。

【図面の簡単な説明】

【図1】本発明に成るインペラの例の部分断面で示す説明図である。

【図2】本発明に成るインペラの別の例の部分拡大断面図である。

【図3】図1または図2の例の側板（板部材）へのブレード（被着部材）端部挿入前の様子を示す説明図である。

【図4】図1または図2の例の側板（板部材）へのブレード（被着部材）端部挿入状態を示す説明図である。

【図5】従来技術に成る例として示すインペラの正面図である。

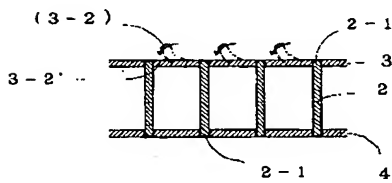
【図6】図5の例の側板（板部材）とブレード（被着部材）との嵌着状態を示す矢視断面図である。

【図7】図5の例の側板（板部材）とブレード（被着部材）との嵌着前の状態を示す説明図である。

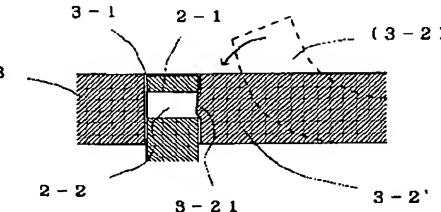
【符号の説明】

- | | |
|------|----------------------------------|
| 1 | インペラ |
| 2 | ブレード（被着部材） |
| 2-1 | ブレードの挿入嵌着用小突起（被着部材の嵌着部） |
| 2-2 | ブレードの挿入嵌着用小突起（被着部材の嵌着部）に穿設する端部小孔 |
| 3 | 他方の側板（板部材） |
| 3-1 | 他方の側板の小孔もしくは溝 |
| 3-2 | 他方の側板の小孔もしくは溝の一边を構成する切起部 |
| 3-2' | 切起部の曲げ戻し |
| 4 | 一方の側板（板部材） |
| 4-1 | 一方の側板の小孔もしくは溝 |

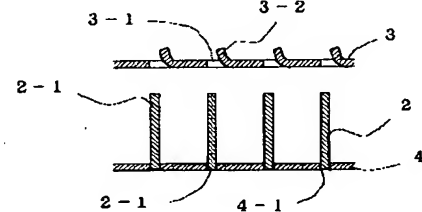
【図1】



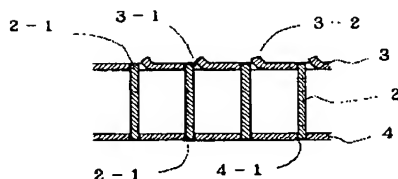
【図2】



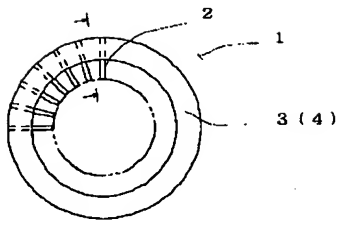
【図3】



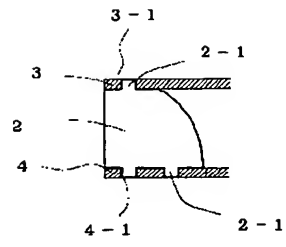
【図4】



【図5】



【図6】



【図7】

